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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/926,033	11/07/2001	Takeshi Oohashi	011022	3978

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EXAMINER	
THORNTON, YVETTE C	

/ 0

ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 05/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/926,033	OOHASHI ET AL.	
	Examiner	Art Unit	
	Yvette C. Thornton	1752	

-- The MAILING DATE of this communication appears n the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

This is written in reference to application number 09/926033 filed on July 7, 2001 which is a 371 of PCT/JP00/01221 filed on March 2, 2000.

Information Disclosure Statement

1. The Information Disclosure Statement filed on December 14, 2001 has been entered and fully considered.

Response to Amendment

2. The preliminary amendments filed on November 7, 2001, February 7, 2003, February 27, 2003 and March 4, 2003 have been entered and fully considered.

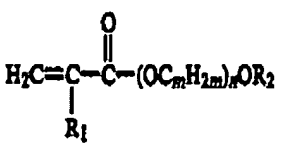
3. Support for the amendment to the instant claims is found in the specification on page 13, lines 27-35.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

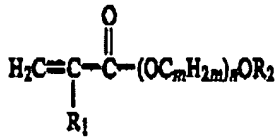
> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 4-13, 16-18 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Lipson (EP 128014 A2). Lipson teaches a photopolymerization composition comprising (A) from 10-60 parts by weight (pbw) of an addition polymerization material comprised of (i) from 5-50 pbw of an acrylate of the formula:



wherein m is 1-4, n is 1-12, R1 is H, CH3 and mixtures thereof and R2 is selected from a substituted or unsubstituted phenyl, substituted or unsubstituted naphthenyl, a branched, unbranched, substituted or unsubstituted alkyl having 1-12 carbons, or a substituted or unsubstituted cycloalkyl group having 5-6 carbon atoms in the ring; and (ii) from 5-50 pbw of one or more non-gaseous compounds containing at least two terminal ethylenic groups and having a boiling point of 100°C; (B) from 0.001-20 pbw of a photoinitiated free radical generating addition polymerization initiating system; (C) from 0.001-5 pbw of a thermal addition polymerization inhibitor; and (D) from 40-90 pbw of a preformed macromolecular polymeric binding agent which is a polymer of (i) a first monomer material which contains one or more non-acidic compounds and (ii) a second monomer material which consists essentially of one or more ethylenically unsaturated carboxylic acid or anhydride containing monomers having 3-15 carbon atoms (see claim 1).

Example V exemplifies a composition comprising a copolymer of methyl methacrylate (35%), butyl methacrylate (11%), styrene (23%) and methacrylic acid (30%) in a solvent mixture of methyl ethyl ketone/isopropyl alcohol. It is the examiner's position that the said copolymer meets the limitation of a carboxyl group containing binder, which contains styrene or a styrene derivative. The said copolymer further meets the limitations of the instant claims 4, 16 and 21 wherein the methyl methacrylate (35%) and butyl methacrylate (11%) together meet the requirement of claimed monomer (III) in the amount of 30-75%. The composition of Example V further comprises phenoxydiethoxyethyl acrylate, which has the formula

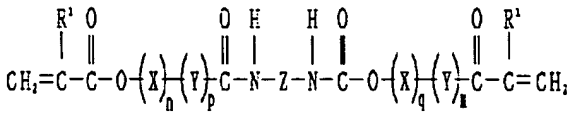


wherein m=2; n=4; and R2=unsubstituted phenyl group. Although Lipson fails to exemplify a compound wherein n is anything other than 4, one of ordinary skill in the art would have readily envisaged each and every compound within the taught range of n=1-12 (pg. 7, l. 6-pg. 8, l. 10). It is the examiner's position that when n is in the range of 6-12 it anticipates the claimed range of the instant invention. Lipson teaches that the preferred acrylates are substituted and unsubstituted phenoxypolyethoxyethyl acrylates and substituted and unsubstituted phenoxypolypropoxypropyl acrylates (pg. 9, l. 10-19). The substituents for the phenyl or naphthenyl groups are selected such that they do not substantially adversely affect the characteristics of the photopolymerizable composition and may be halogen (Cl, Br, I) groups, C1-15 alkyl groups and C1-15 alkoxy groups (pg. 8, l. 5-10). Examples of the substituted phenoxypolyethoxyethyl acrylate include chlorophenoxypolyethoxyethyl acrylate and methacrylate (pg. 8, l. 24-25).

The composition of example V was coated onto a polyester film, dried and covered with a polyethylene film (pg. 35, l. 5-pg. 36, l. 30). The polyethylene cover film is removed and the bared resist coating is laminated to a clean copper-clad epoxy fiberglass board. The resulting film is exposed to light through a high-contrast transparency. The polyester support film is peeled off and the exposed resist layer is developed and etched (pg. 28, l. 17-pg. 29, l. 24).

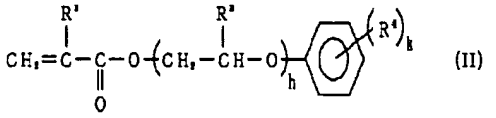
6. Claims 7-11, 14-15, 18-20 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishikawa (JP 10-020491 A, machine translation). Ishikawa teaches a

photosensitive resin composition comprising (A) a film forming polymer of (meth)acrylic alkyl esters and alkyl methacrylate ester, (B) a photopolymerization initiator, (C) a compound of general formula (I):



(I)

and (D) a compound of general formula (II):



(II)

(see claims; p. 0005-0006). X of formula (I) is -CH2CH2O; Y is selected from a 6 different C3-6 alkoxy groups; Z is a hydrocarbon group having 2-16 carbon atoms; and n, m, p and q are an integer from 1-14. (p. 0005). It is the examiner's position that X and Y together meet the limitations of B1 and B2 of claimed formula II. In taught formula (II), h is 3-20; R2 is hydrogen or a methyl group; R3 is hydrogen or C1-4 alkyl; R4 is C4-14 alkyl group; and k is 1-3. It is the examiner's position that when h is 6-20, taught formula (II) clearly anticipates claimed formula (V) and (VI). Suitable examples of the taught photopolymerizable initiator (B) include aromatic ketones, benzoin ethers, 2,4,5-triarylimidazole dimers and acridine derivatives (p. 0011). The taught composition is coated onto a substrate and dried to form a photosensitive film. The said film was covered with a protective film and laminated to a copper substrate. The film is irradiated through a negative or positive mask pattern and developed to form a resist pattern (p. 0018-0020).

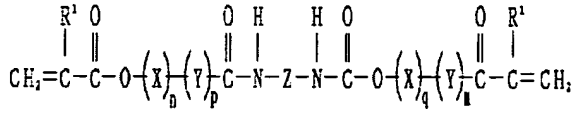
Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

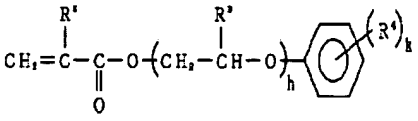
8. Claims 2-3, 14-15 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lipson et al. (EP 128014 A2) as applied to claims 1, 4-13, 16-18 and 21-23 above, and further in view of Ishikawa et al. (JP 10-020491 A, machine translation).

Lipson as discussed above teaches all the limitation of the instant claims except it fails to teach and/or suggest the use of a 2,4,5-triarylimidazole dimer as set forth in instant claims 2, 14 and 19. Lipson also fails to teach the use of a compound of formula (II) as in instant claims 3, 15 and 20. Ishikawa teaches a photosensitive resin composition comprising (A) a film forming polymer of (meth)acrylic alkyl esters and alkyl methacrylate ester, (B) a photopolymerization initiator, (C) a compound of general formula (I):



(I)

and (D) a compound of general formula (II):



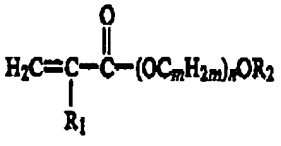
(II)

(see claims; p. 0005-0006). X of formula (I) is -CH2CH2O, Y is selected from a 6 different C3-6 alkoxy groups, Z is a hydrocarbon group having 2-16 carbon atoms and n, m, p and q is an integer from 1-14. (p. 0005). It is the examiner's position that X and Y together meet the limitations of B1 and B2 of claimed formula II. One of ordinary skill in the art would have been motivated by the teachings of Ishikawa to incorporate a compound of general formula (I) into the taught composition of

Lipson in order to increase the sensitivity, intensity and elongation of a the hardened film (see Ishikawa p. 0015).

Ishikawa also teaches that suitable examples of the taught photopolymerizable initiator (B) include aromatic ketones, benzoin ethers, 2,4,5-triarylimidazole dimers and acridine derivatives (p. 0011). It would have been obvious to one of ordinary skill in the art to use any photoinitiator, such as 2,4,5-triarylimidazole dimers, which are well-known and conventional in the art in the composition of Lipson.

9. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lipson et al. (EP 128014 A2) as applied to claims 1, 4-13, 16-18 and 21-23 above, and further in view of Kawashima (US 6048953 A).

Lipson as discussed above teaches all the limitation of the instant claims except it fails to teach and/or suggest a composition further comprising 2,2-bis[4-(acryloxypolyethoxy)-phenyl]propane or 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane as set forth in instant claims 24-26. Lipson does however teach that the taught addition polymerization material comprises (i) from 5-50 pbw of an acrylate of the formula:  and (ii) from 5-50 pbw of one or more non-gaseous compounds containing at least two terminal ethylenic groups an having a boiling point of 100°C. Example of the non-gaseous compounds include ester of the methylene carboxylic acid such as diethylene glycol diacrylate and bis-acrylates and methacrylates of polyethylene and polypropylene glycols such as tripropylene glycol diacrylate (c. 5, l. 60-c. 6, l. 16).

Kawashima (US 6048953 A) teaches the use of a (meth)acrylic monomer (B) having at least one unsaturated double bond in its molecule to adjust the viscosity and the curability of the solventless liquid resin composition. Examples include diethylene glycol di(meth)acrylate, tripropylene glycol di(meth)acrylate, 2,2-bis[4-(acryloxypolyethoxy)phenyl]propane and 2,2-bis[4-(methacryloxypolyethoxy)phenyl] propane. It is the examiner's position that Kawashima serves to equate 2,2-bis[4-(acryloxypolyethoxy)phenyl]propane, 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane, diethylene glycol di(meth)acrylate and tripropylene glycol di(meth)acrylate in the art. Therefore, one of ordinary skill in the art would have been motivated to substitute 2,2-bis[4-(acryloxypolyethoxy)phenyl]propane or 2,2-bis[4-(methacryloxypolyethoxy)phenyl]propane for the taught diethylene glycol diacrylate and tripropylene glycol diacrylate of Lipson and expect reasonably similar results.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Lipson et al. (US 4539286 A) which is the U.S. equivalent of cited prior art document EP 10-02491.
- Huemmer et al. (US 4925769 A) which teaches a light sensitive photopolymerization laminate material.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet C. Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

13. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.

Yvette Clarke Thornton

Yvette Clarke Thornton
Junior Examiner
Art Unit 1752

yct
May 15, 2003